

R. BUCKMINSTER FULLER

I once interviewed R. Buckminster Fuller (1895–1983). That is to say, I once held a microphone in front of his mouth while he embarked on a stunning, elliptical, and semiconnected 20-minute ramble that touched on everything from rocket travel to architecture to why he wore three watches (so that he could know the time where he was, where he was going, and at his home base). Fuller considered himself a citizen of the Earth, and he considered the Earth in need of considerable improvement, which he was willing to arrange. Some of his inventions—notably the geodesic dome, which could sustain its own weight even when blown up to enormous size as in the American pavilion at Montreal's Expo '67—were great successes. Others, like the three-wheeled Dymaxion Car, were not. But Fuller at heart was an environmentalist, deeply concerned with the question he poses in this essay: "Does humanity have a chance to survive lastingly and successfully on planet Earth, and if so, how?" He thought that the growth of knowledge, combined with the ability to recycle the Earth's materials, offered a way out for a planet in peril, and his exuberance was persuasive for many. Marshall McLuhan, who shared the same essential optimism about the emerging infosphere, coined the term "global village." Fuller's "Spaceship Earth" is the other great description of our planet from the moment of new insight that coincided with the first views back from outer space.

Spaceship Earth

Our little Spaceship Earth is only eight thousand miles in diameter, which is almost a negligible dimension in the great vastness of space. Our nearest star—our energy-supplying mother-ship, the Sun—is ninety-two million miles away, and the next nearest star is one hundred thousand times further away. It takes two and one-half years

for light to get to us from the next nearest energy supply ship star. That is the kind of space-distanced pattern we are flying. Our little Spaceship Earth is right now travelling at sixty thousand miles an hour around the sun and is also spinning axially, which, at the latitude of Washington, D.C., adds approximately one thousand miles per hour to our motion. Each minute we both spin at one hundred miles and zip in orbit at one thousand miles. That is a whole lot of spin and zip. When we launch our rocketed space capsules at fifteen thousand miles an hour, that additional acceleration speed we give the rocket to attain its own orbit around our speeding Spaceship Earth is only one-fourth greater than the speed of our big planetary spaceship.

Spaceship Earth was so extraordinarily well invented and designed that to our knowledge humans have been on board it for two million years not even knowing that they were on board a ship. And our spaceship is so superbly designed as to be able to keep life regenerating on board despite the phenomenon, entropy, by which all local physical systems lose energy. So we have to obtain our biological life-regenerating energy from another spaceship—the sun.

Our sun is flying in company with us, within the vast reaches of the Galactic system, at just the right distance to give us enough radiation to keep us alive, yet not close enough to burn us up. And the whole scheme of Spaceship Earth and its live passengers is so superbly designed that the Van Allen belts, which we didn't even know we had until yesterday, filter the sun and other star radiation which as it impinges upon our spherical ramparts is so concentrated that if we went nakedly outside the Van Allen belts it would kill us. Our Spaceship Earth's designed infusion of that radiant energy of the stars is processed in such a way that you and I can carry on safely. You and I can go out and take a sunbath, but are unable to take in enough energy through our skins to keep alive. So part of the invention of the Spaceship Earth and its biological life-sustaining is that the vegetation on the land and the algae in the sea, employing photosynthesis, are designed to impound the life-regenerating energy for us to adequate amount.

But we can't eat all the vegetation. As a matter of fact, we can eat very little of it. We can't eat the bark nor wood of the trees nor the

grasses. But insects can eat these, and there are many other animals and creatures that can. We get the energy relayed to us by taking the milk and meat from the animals. The animals can eat the vegetation, and there are a few of the fruits and tender vegetation petals and seeds that we can eat. We have learned to cultivate more of those botanical edibles by genetical inbreeding.

That we are endowed with such intuitive and intellectual capabilities as that of discovering the genes and the R.N.A. and D.N.A. and other fundamental principles governing the fundamental design controls of life systems as well as of nuclear energy and chemical structuring is part of the extraordinary design of the Spaceship Earth, its equipment, passengers, and internal support systems. It is therefore paradoxical but strategically explicable, as we shall see, that up to now we have been mis-using, abusing, and polluting this extraordinary chemical energy-interchanging system for successfully regenerating all life aboard our planetary spaceship.

One of the interesting things to me about our spaceship is that it is a mechanical vehicle, just as is an automobile. If you own an automobile, you realize that you must put oil and gas into it, and you must put water in the radiator and take care of the car as a whole. You begin to develop quite a little thermodynamic sense. You know that you're either going to have to keep the machine in good order or it's going to be in trouble and fail to function. We have not been seeing our Spaceship Earth as an integrally-designed machine which to be persistently successful must be comprehended and serviced in total.

Now there is one outstandingly important fact regarding Spaceship Earth, and that is that no instruction book came with it. I think it's very significant that there is no instruction book for successfully operating our ship. In view of the infinite attention to all other details displayed by our ship, it must be taken as deliberate and purposeful that an instruction book was omitted. Lack of instruction has forced us to find that there are two kinds of berries—red berries that will kill us and red berries that will nourish us. And we had to find out ways of telling which-was-which red berry before we ate it or otherwise we would die. So we were forced, because of a lack of an instruction book, to use our

intellect, which is our supreme faculty, to devise scientific experimental procedures and to interpret effectively the significance of the experimental findings. Thus, because the instruction manual was missing we are learning how we safely can anticipate the consequences of an increasing number of alternative ways of extending our satisfactory survival and growth—both physical and metaphysical.

Quite clearly, all of life as designed and born is utterly helpless at the moment of birth. The human child stays helpless longer than does the young of any other species. Apparently it is part of the invention "man" that he is meant to be utterly helpless through certain anthropological phases and that, when he begins to be able to get on a little better, he is meant to discover some of the physical leverage-multiplying principles inherent in universe as well as the many nonobvious resources around him which will further compoundingly multiply his knowledge-regenerating and life-fostering advantages.

I would say that designed into this Spaceship Earth's total wealth was a big safety factor which allowed man to be very ignorant for a long time until he had amassed enough experiences from which to extract progressively the system of generalized principles governing the increases of energy managing advantages over environment. The designed omission of the instruction book on how to operate and maintain Spaceship Earth and its complex life-supporting and regenerating systems has forced man to discover retrospectively just what his most important forward capabilities are. His intellect had to discover itself. Intellect in turn had to compound the facts of his experience. Comprehensive reviews of the compounded facts of experiences by intellect brought forth awareness of the generalized principles underlying all special and only superficially-sensed experiences. Objective employment of those generalized principles in rearranging the physical resources of environment seems to be leading to humanity's eventually total success and readiness to cope with far vaster problems of universe.

To comprehend this total scheme we note that long ago a man went through the woods, as you may have done, and I certainly have, trying to find the shortest way through the woods in a given direction. He found trees fallen across his path. He climbed over those crisscrossed

trees and suddenly found himself poised on a tree that was slowly teetering. It happened to be lying across another great tree, and the other end of the tree on which he found himself teetering lay under a third great fallen tree. As he teetered he saw the third big tree lifting. It seemed impossible to him. He went over and tried using his own muscles to lift that great tree. He couldn't budge it. Then he climbed back atop the first smaller tree, purposefully teetering it, and surely enough it again elevated the larger tree. I'm certain that the first man who found such a tree thought that it was a magic tree, and may have dragged it home and erected it as man's first totem. It was probably a long time before he learned that any stout tree would do, and thus extracted the concept of the generalized principle of leverage out of all his earlier successive special-case experiences with such accidental discoveries. Only as he learned to generalize fundamental principles of physical universe did man learn to use his intellect effectively.

Once man comprehended that any tree would serve as a lever his intellectual advantages accelerated. Man freed of special-case superstition by intellect has had his survival potentials multiplied millions fold. By virtue of the leverage principles in gears, pulleys, transistors, and so forth, it is literally possible to do more with less in a multitude of physio-chemical ways. Possibly it was this intellectual augmentation of humanity's survival and success through the metaphysical perception of generalized principles which may be objectively employed that Christ was trying to teach in the obscurely told story of the loaves and the fishes.

Operating Manual for Spaceship Earth (1969)